Oceanic Weather Information: Oceanic Convective Nowcasting Demonstration (OCND)

Weather Accident Prevention Annual Review
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Overview

- Oceanic/remote area aviation weather requirements
- On-going research addressing requirements
- Oceanic Convective Nowcasting Demonstration (OCND)

What the industry needs

- Timely generation and distribution of weather information for en route oceanic operations
  - Weather *information* (vs. data) addressing hazards
    - » Convection
    - » Turbulence—convective induced and clear air (CIT/CAT)
    - » Icing
    - » Volcanic ash dispersion
    - » High-resolution (time and space) flight-level winds
  - Distribution infrastructure and displays—ground and airborne

What we are doing

- FAA sponsored Product Development Teams (PDTs) within AUA-430 and led by NCAR
  - Oceanic Weather PDT. Products for data sparse regions include
    - » Convective diagnoses, nowcasts, forecasts
    - » Turbulence, all types
    - » In-flight icing
    - » Volcanic ash
    - » High resolution winds
  - National C&V PDT
    - » High-resolution (time and space) national C&V diagnoses and forecasts
- Development and implementation of “intelligent weather systems”

Oceanic Weather

- "Intelligent weather systems"
  - Use of expert system framework to mimic what a meteorologist does to generate a forecast
  - Allows fast and precise assimilation of all data that can add skill to generate *informational* products
  - Result: rapidly and frequently updated, high resolution, 4-dimensional graphic of the weather hazard that is easily transmitted to ground and airborne users

Oceanic Convection

- For example, diagnosing and nowcasting convection
  - Visual satellite imagery to locate clouds
  - Infrared satellite imagery to determine cloud tops
  - Water vapor channel to determine spot winds
  - Global numerical model data for assimilating spot winds and creating a uniform wind field
  - Lightning data and cloud classification algorithms to distinguish convection
  - Plus use of any available ground station data and radar data

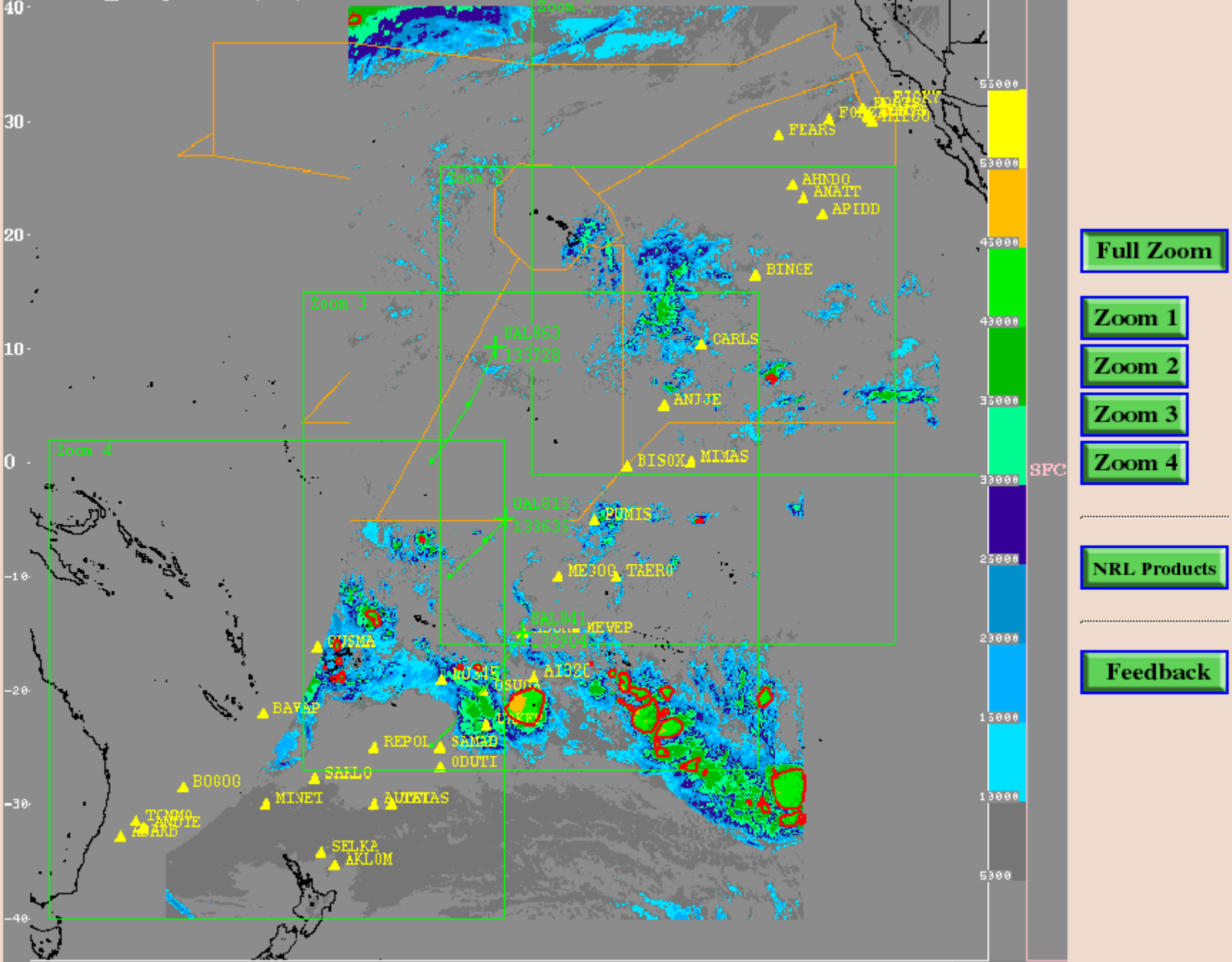
Integration yields a precise diagnosis and nowcast of convection in 3 dimensions

OCND—Prelude to OWPDT

- Purpose
  - Primary focus: Demonstrate and implement an end-to-end weather hazard and product dissemination system for remote/oceanic areas. Users include airline dispatch, air traffic control, and the airborne flight crew (data link).
  - Develop operationally useful weather products, including the automated process to create them, for remote/oceanic areas. Products include convection, turbulence, in-flight icing, and satellite-based winds (diagnoses, forecasts).
- Participants—NCAR (lead), United Airlines, Aviation Weather Center (NWS), Naval Research Laboratory, Oakland Oceanic ARTCC, ARINC
- Sponsors—FAA Aviation Weather Research Program (AWRP) and NASA Aviation Weather Information (AWIN) Program

OCND Program

- OCND regional focus—flights to/from CONUS and New Zealand/Australia
  - Automated product creation (convective hazards initially) at NCAR
  - Transmission to and display at United dispatch and Oakland Center
  - Data link to the aircraft via ARINC
  - Evaluation, feedback, and further development



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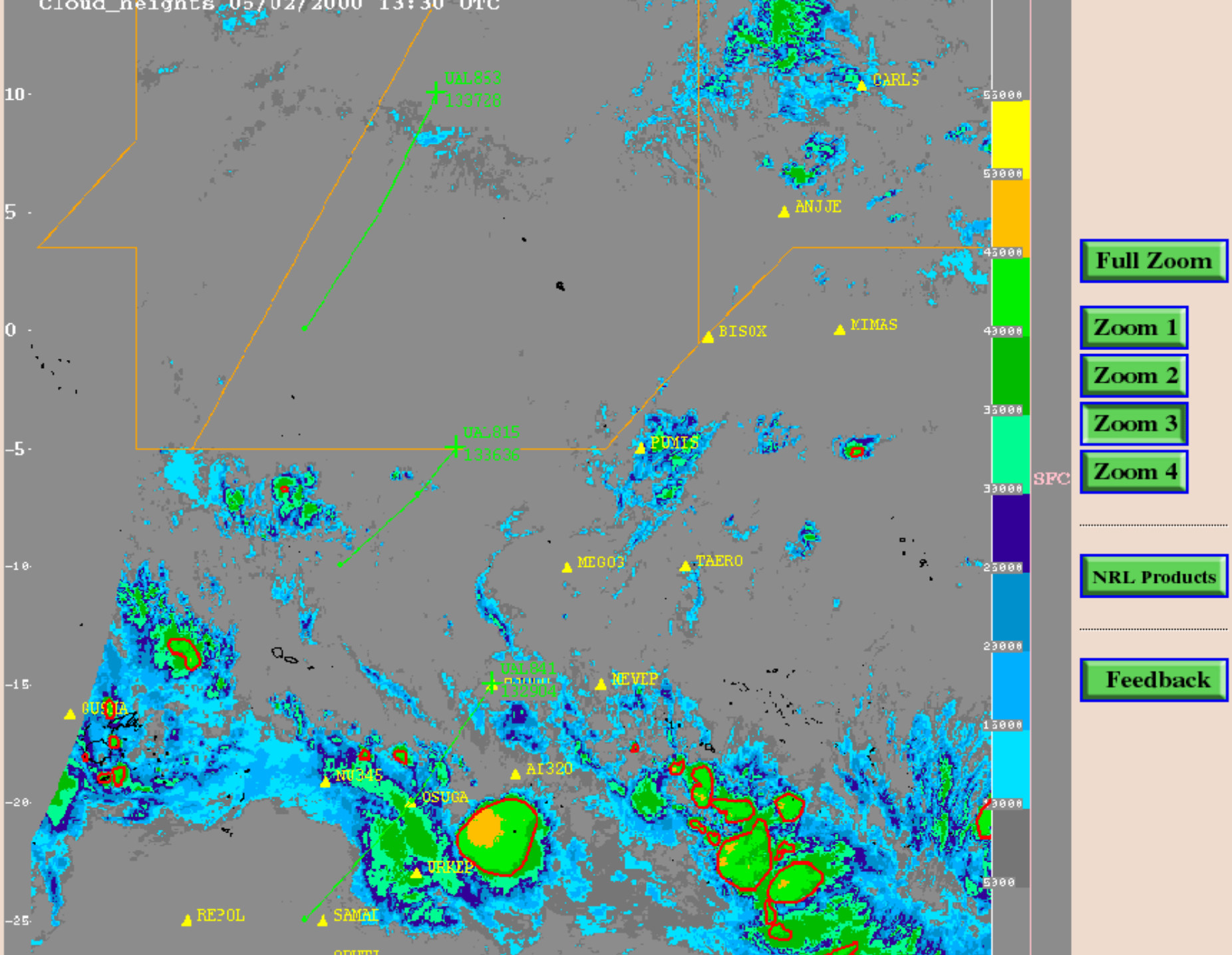
Zoom 2

Zoom 3

Zoom 4

NRL Products

Feedback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NRL Products
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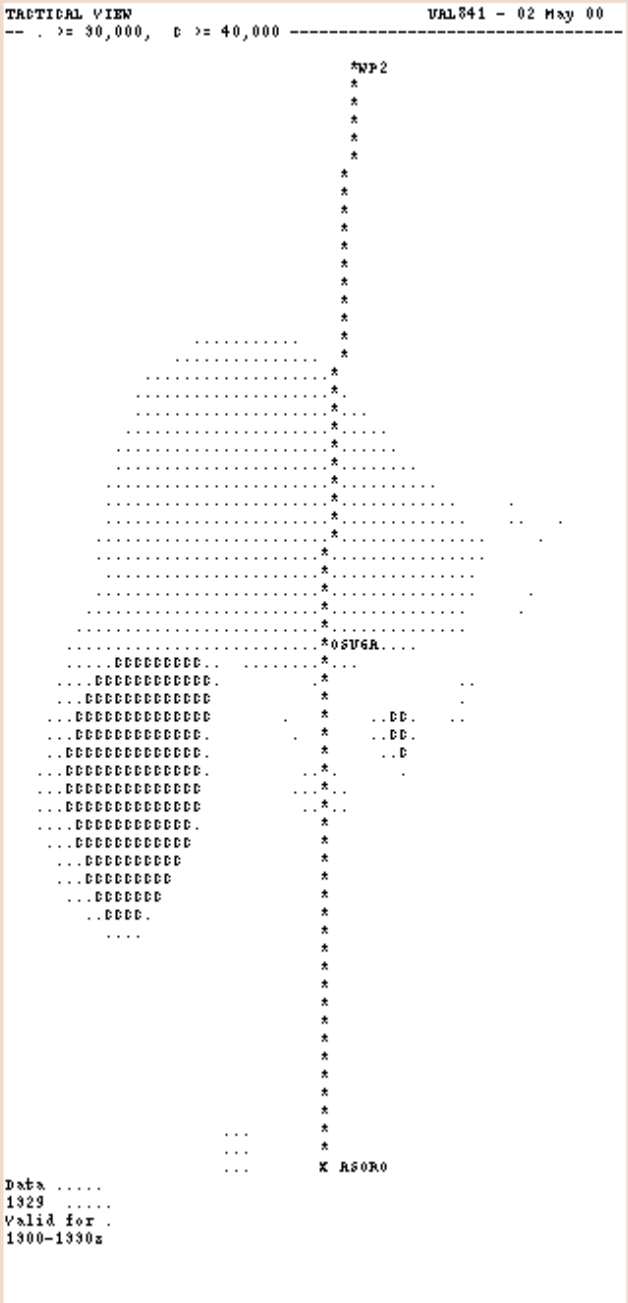

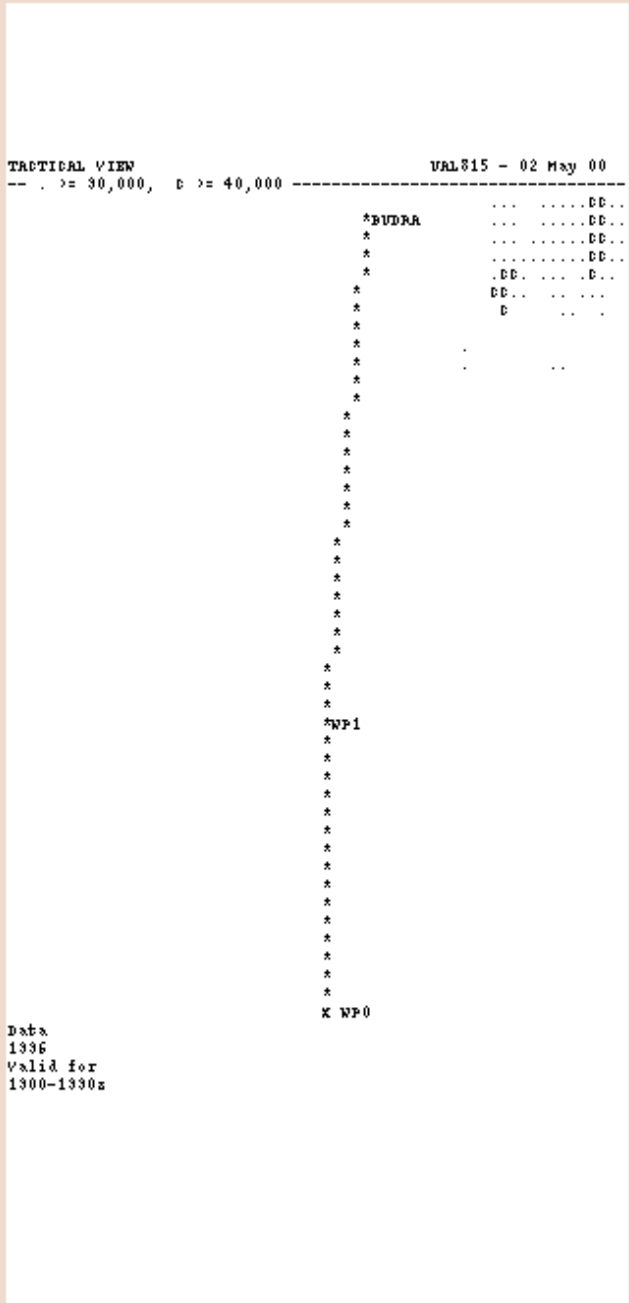

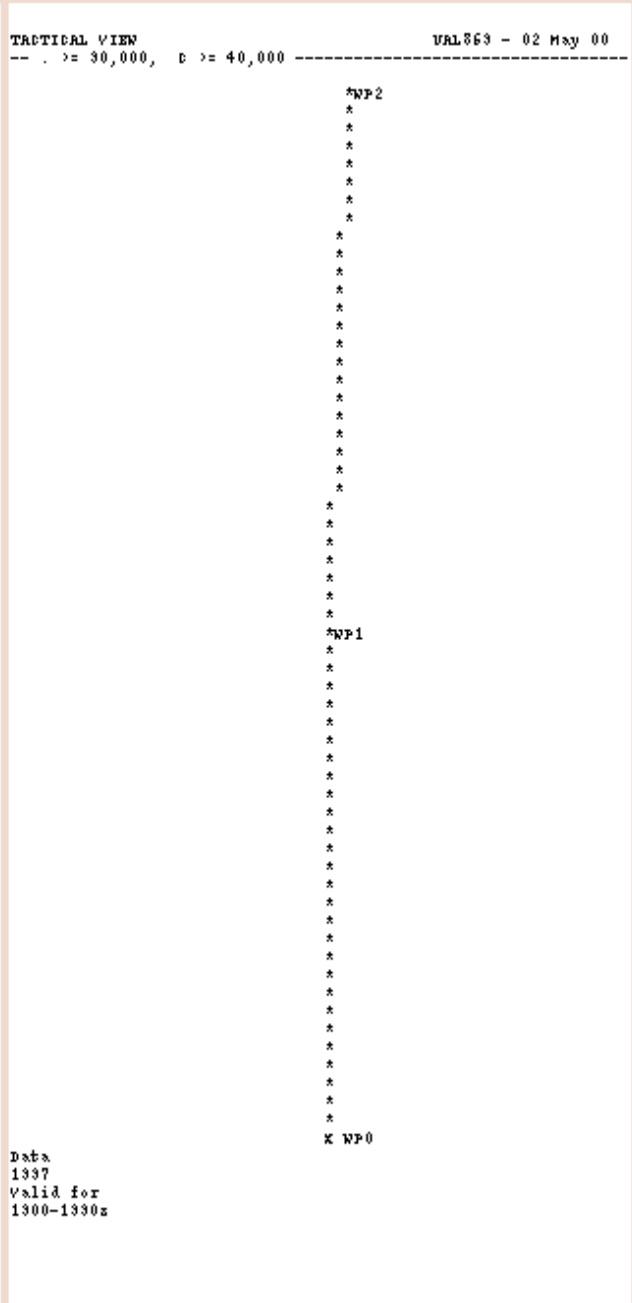

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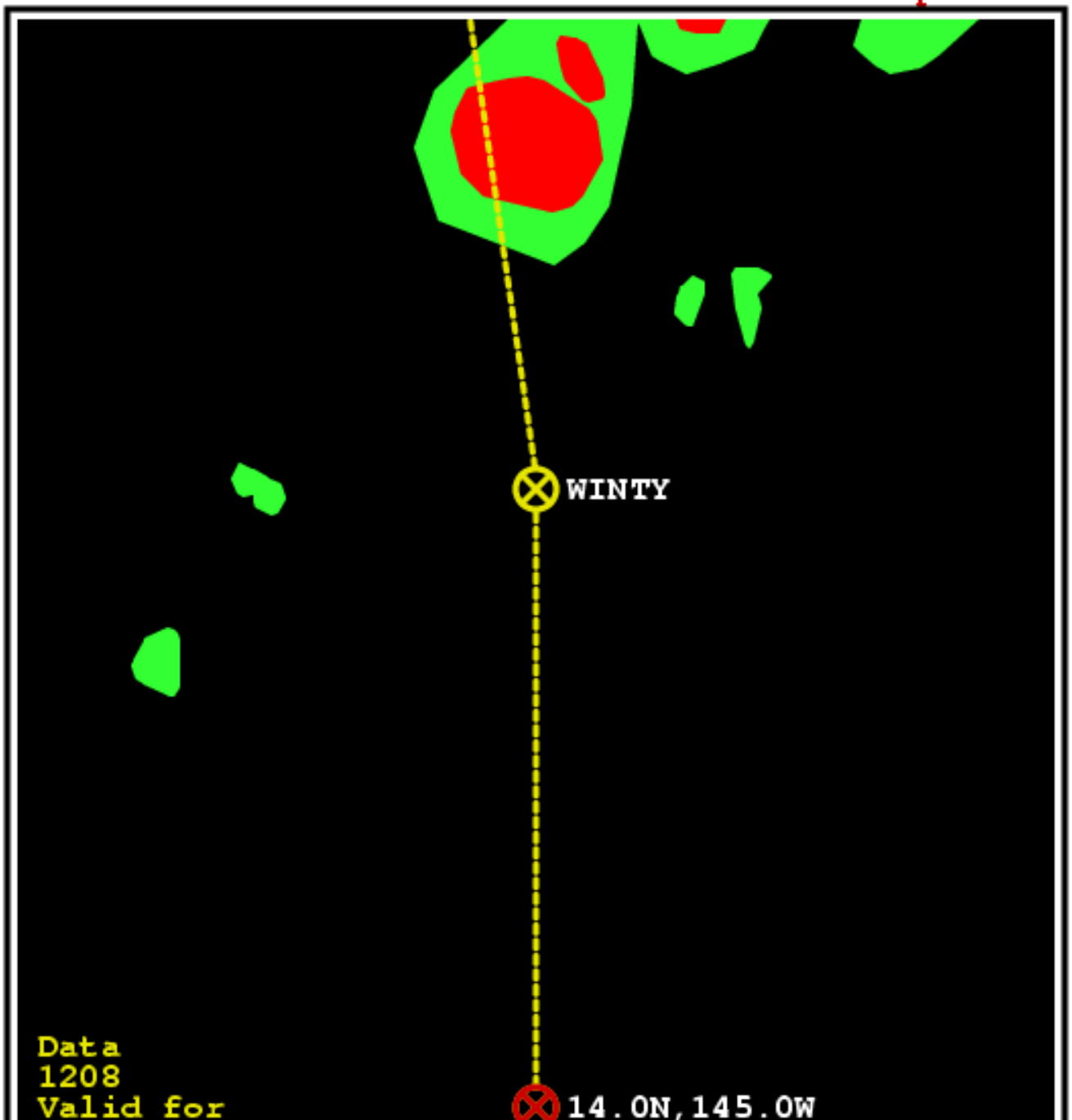

Summary

- Convective diagnosis—ready now. Check it out at http://www.rap.ucar.edu/projects/ocnd/realtime_sys/
- Convective nowcasts, CIT, CAT, in-flight icing—in the development pipeline and will be ready for evaluation in FY03
- Product development includes dissemination infrastructure
- Initial feedback from flight crews and dispatch indicates the information is of high value
- Status of data link to the flight deck…